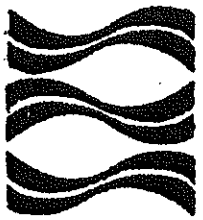

ROINN NA MARA

ROE YIELD OF IRISH HERRING

by

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Fishery Leaflet 144

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This Leaflet provides the detailed information on the spawning condition of herring required to develop the trade in the roe fishery. It is based on the laboratory examination of two thousand individual specimens supplied by the Industry.

Most of the roe for export comes from the autumn and winter fisheries on the south coast, landed at Dunmore East, Cobh and Baltimore.

Herring with marketable roe (maturity stage VI) begin to appear in September and from November to January account for more than 45% of the catch. The percentage begins to fall in February but in some years continues to be high enough for a successful roe fishery as late as March.

Perhaps the most important factor in the roe fishery is the potential yield - the amount of roe which can be extracted from a landing of fish. Obviously the higher the yield of top quality roe, the better will be the results for the processor. The yield depends on biological and non-biological factors.

The non-biological factors which affect the yield would appear to be the handling of fish at sea, the handling during unloading and transporting of catch to the factories and the subsequent techniques employed in the factories in the actual removal of the roe.

The biological factors are:

the sex ratio within the catches;
the maturities or stage of ripeness of individualfish;
the length and weight of the fish;
the time of the year at which fish are landed

Sex ratio

Although slight variations do occasionally occur, in general the overall sex ratio is taken as 1:1. The results of sex determinations during two seasons are given in Table 2.

Except for the months of October and November 1987 when for some unknown reason the females out numbered the males, the overall sex ratios were very consistent and close to 1:1.

Maturity stages

The gonads (male and female) are classified into the following eight stages.

Stage I Virgins: very small sexual organs close to vertebral column. Females: wine coloured torpedo-shaped ovaries about 2-3 mm thick, eggs invisible to naked eye. Males: whitish or greyish brown knife-shaped testes 2-3 cm long and 2-3mm broad.

Stage II Maturing virgins: ovaries somewhat more than half the length of ventral cavity, about 1 cm diameter, eggs small but visible to naked eye. Testes: milt whitish, same size as ovaries but still thin and knife shaped.

In September 1987 no stage VI were landed, while only 29% and 36% of the total number of fish landed in October in 1986 and 1987 were in this stage. In November the numbers of stage VI females had risen to 48% and 44% and the figures were similar for December. In January between 42% and 46% of females were stage VI but smaller numbers of spent fish were also present. The number of spent fish increased considerably in February 1987 and amounted to over 10%. These figures represent the average of a number of samples taken throughout each month and will therefore conceal considerable variations that occur, for example, the numbers of spent fish may be higher than indicated.

Roe yield

In addition to information about the seasonal distribution of spawning fish and the sex ratio within the catches, processors also require information about the percentage weight of each catch which may be composed of suitable roe. Therefore because of the number of inquiries received in recent years from people involved in roe extraction, it was decided to weigh a number of ovaries at various times of the season. The results are given in Table 4.

The weights of ovaries given are the total weights from all stage VI fish. This would therefore include ovaries which might not be considered suitable by Japanese technicians and the weights in the table are therefore overestimated. However, they do give an indication of the variations that occur throughout the season and also how the ovarian weights vary with the length of the fish.

The figures indicate that the average roe in many cases exceeds 20% of the total weight of female fish, the equivalent of an overall yield of over 10%. As has been explained, not all these roes would be suitable for extraction purposes, and in many cases the overall yield would be considerably less. However the table gives an indication of the variations that can be expected. It also demonstrates that in some cases the roe yield can be very low and fish bought specifically for roe processing must have yielded an uneconomic return - emphasizing the importance of experimental fishing.

Roe weight per length: The percentage roe yields per length of fish are shown for selected samples in Figs. 1. In general the weight of the roe is not a constant proportion in the females but increases as the fish grows - a higher yield can be expected from the bigger fish.

Table 3. Percentage of fish at each maturity stage

1986/1987		I	II	III	IV	V	VI	VII
Oct								
	Males		0.70	0.20	1.00	16.90	27.60	3.30
	Females		1.40	0.10	1.70	16.10	28.80	2.10
Nov								
	Males		0.20					
	Females					1.30	47.50	1.90
Dec								
	Males	0.30					46.20	1.00
	Females	0.10				0.40	47.80	2.10
Jan								
	Males					0.50	50.70	0.10
	Females					1.70	42.70	3.40
Feb								
	Males		0.40				48.40	3.60
	Females		0.80			2.70	34.00	10.20
Mar								
	Males						48.00	3.60
	Females						48.00	2.00
1987/1988								
Sept								
	Males	1.90	4.10	1.40	5.80	37.00		0.40
	Females	1.40	3.90	0.70	11.70	31.60		
Oct								
	Males			0.10		11.40	44.40	2.00
	Females					4.80	36.40	1.00
Nov								
	Males						54.20	1.00
	Females					0.10	44.20	0.50
Dec								
	Males			0.50		0.10	50.40	0.40
	Females					1.40	47.20	0.10
Jan								
	Males		0.40	0.10		0.50	46.60	0.10
	Females		0.80			3.40	46.00	1.40
Feb								
	Males	0.30	0.30				45.60	1.40
	Females	0.10	0.70			1.40	49.30	1.00

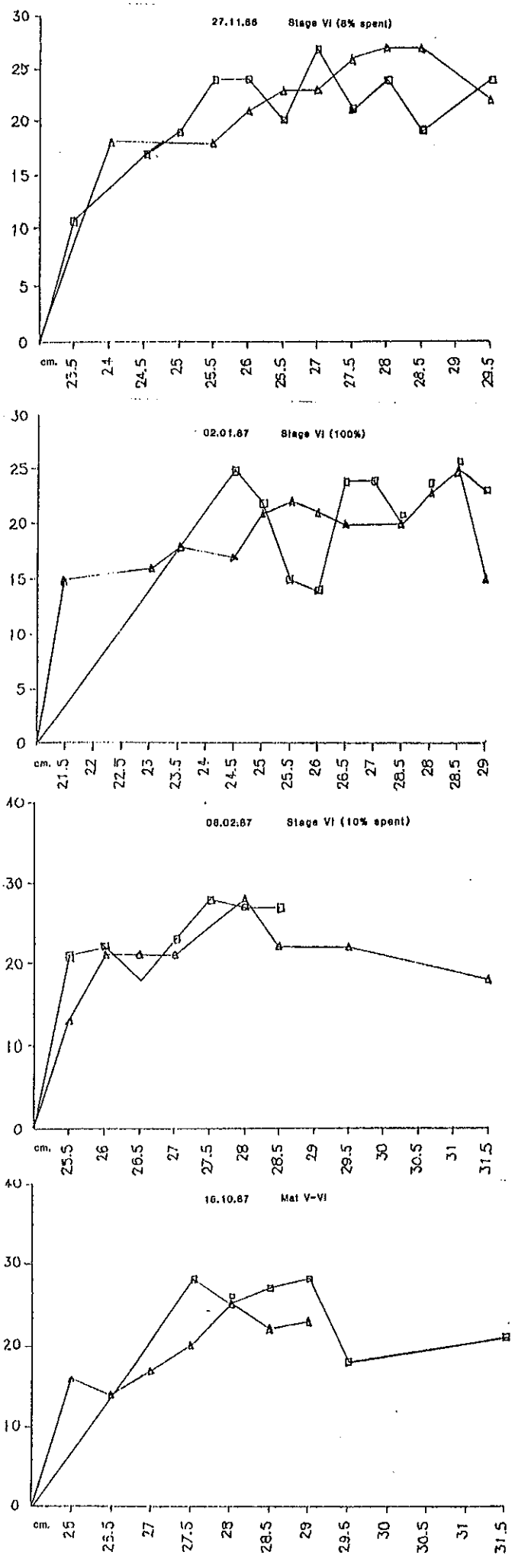

Fig 1. Percentage by weight of roe in each length group Δ male □ female